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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,259	08/26/2003	Yasunori Suzuki	241973US90	2085

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ALEXANDRIA, VA 22314

EXAMINER

BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
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2611

NOTIFICATION DATE	DELIVERY MODE
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04/10/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/647,259

Applicant(s)

SUZUKI ET AL.

Examiner

Emmanuel Bayard

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period **will** apply and **will** expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply **will**, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/2/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

This is in response to amendment filed on 1/24/08 in which claims 1 and 3-6 are pending. The applicant's amendments have been fully considered but they are moot based on the new ground of rejection. Therefore this case is made final.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Gans et al U.S. patent No 5,604,462.

3. As per claim 1, Gans et al teaches a transmitter comprising: an input-side digital multi-port directional Butler matrix coupler configured to divide and combine digital transmission signals of N channels by digital processing and configured to output N-combined signals to N transmission paths, respectively (see figs. 1-2, 9, 11 elements 14, 202, 940 and col.3, lines 10-32 and col.4, lines 30-45); N predistorters inserted in said N transmission paths, respectively, configured to provide compensating predistortions to the N-combined signals outputted from said input- side digital multi-port directional coupler (see figs. 3-4 elements 302-I and col.4, lines 28-30 and col.5, lines 60-67); N transmitting parts inserted in said N transmission paths, respectively, configured to convert output signals from said N predistorters to N high-frequency signals, each of said N transmitting parts including a power amplifier for amplifying

Art Unit: 2611

power of the high-frequency signal (see figs 1-2, 9 and 11 elements A1-AN and col.1, lines 15-20 and col.3, lines 10-15 and col.9, lines 35-49); an output-side multi-port Butler matrix directional coupler power combiner configured to divide and combine said N high-frequency signals to output N high-frequency transmission signals (see figs 1-2, 9 and 11 elements 15, 204, 950 and col.3, lines 60-67 and col.5, lines 18-20); and N receiving parts (see figs.3, 5, 9, 11 elements 306-i an 1106) configured to extract, from said N high-frequency signals, distortion components produced by the power amplifiers and configured to generate, based on said distortion components, compensating signals which control said N predistorters (see col.8, lines 1-10), wherein based on said compensating signals, said N predistorters generate compensating predistortions and impart said compensating predistortions to said N-combined signals from said input-side digital multi-port directional coupler, respectively, to cancel the distortion components at said power amplifiers (see col.5, lines 60-66 and col.6, lines 25-50).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gans et al U.S. patent No 5,604,462 in view of Hongo et al U.S. Pub No 2003/0053552 A1 and in further view of Wright et al U.S. patent No 7,260,365 B1.

6. As per claim 3, Gans et al teaches all the feature of the claimed invention except wherein said N predistorters are digital predistorters configured to impart said compensating predistortions to said N-combined signals from said input-side digital multi-port directional coupler by digital processing, and which further comprises: N digital-to-analog converters inserted in said N transmission paths configured to convert the outputs from said N predistorters to analog signals and configured to apply said analog signals to said N transmitting parts, respectively; and N analog-to-digital converters configured to convert said compensating signals from said N receiving parts to digital compensating signals and configured to apply said N digital compensating signals to said N digital predistorters.

Hongo et al teaches wherein said N predistorters are digital predistorters configured to impart said compensating predistortions to said N-combined signals from said input-side digital multi-port directional coupler by digital processing (see figs. 7-10), and which further comprises s: N digital-to-analog converters inserted in said N transmission paths channels configured to convert the outputs from said N predistorters to analog signals and configured to apply said analog signals to said N transmitting parts, respectively (see figs. 7-8 elements E1-En).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Hongo into Gans so that the distortion produced in the amplifier would cancel each other to zero or nearly zero as taught by Hongo (see page 4 paragraph [0053]).

However Gans and Hongo et al in combination do not teach N analog-to-digital converters configured to convert said compensating signals from said N receiving parts to digital compensating signals and configured to apply said N digital compensating signals to said N digital predistorters.

Wright et al teaches N analog-to-digital converters (see figs. 24-25 element 126 and col.45, lines 40-55) configured to convert said compensating signals from said N receiving parts to digital compensating signals and configured to apply said N digital compensating signals to said N digital predistorters.

It would have been obvious to one of ordinary skill in the art to implement the teaching of Wright et al into Gans and Hongo et al as to adjust the characteristics of the predistorted signals so that a deviation from overall linearity would be compensated and subsequently reduced while maintaining a nearly constant gain attribute during communication between a cellular base station, a public switch network, a mobile service switching center and a data sources (see abstract and col.45, lines 40-55).

As per claim 4, Gans and Hongo et al and Wright et al in combination would teaches wherein said N predistorters channels are analog predistorters, and which further comprises N digital-to- analog converters inserted in said N transmission paths channels configured to convert said N-combined signals output from said input side digital multi-port directional coupler to analog signals for application to said N analog predistorters, said N receiving parts providing said compensating signals to said N analog predistorters as to adjust the characteristics of the predistorted signals so that a deviation from overall linearity would be compensated and subsequently reduced while

Art Unit: 2611

maintaining a nearly constant gain attribute during communication between a cellular base station, a public switch network, a mobile service switching center and a data sources (see abstract and col.45, lines 40-55).

As per claim 5, Hongo et al teaches wherein each of said N transmitting parts includes: an up-converting part configured to up-convert the corresponding one of said N analog signals to a high-frequency signal of the transmission frequency band (see paragraphs [0238-0244]; and the power amplifier configured to amplify the power of said high-frequency signal and configured to apply said power-amplified high-frequency signal to said output side multi- port directional coupler(see figs. 2-4 and 7-8). Furthermore implementing such teaching into Gans and Wright would have been obvious to one skilled in the art so that the distortion produced in the amplifier would cancel each other to zero or nearly zero as taught Hongo (see page 4 paragraph [0053]).

As per claim 6, Gans et al teaches a detecting part configured to detect the corresponding one of said high-frequency signals (see fig.5 element 306); a band-pass filter configured to extract a distortion component by said power amplifier from said detected output (see fig.5 element 506 and a control part configured to generate said compensating signal based on said distortion component (see fig.5 element 510).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 2611

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571 272 3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

4/1/2008

Emmanuel Bayard
Primary Examiner
Art Unit 2611

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